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Subject: Draft Report to the California Legislature: Indoor Air Pollution in California[1]

Dear Ms. Shimer:

The Consumer Specialty Products Association (CSPA) appreciates the opportunity to submit our comments on the Air Resources Board's (ARB's) *Draft for Public Review of the Report to the California Legislature: Indoor Air Pollution in California* as required by Assembly Bill 1173 (Keeley, 2002; Cal. Health & Safety Code § 39930).

BACKGROUND

CSPA took a neutral position on Assembly Bill 1173. CSPA's neutrality was premised on our concern that the Bill failed include a provision to ensure that ARB received adequate funding for developing the mandated Report. Specifically, CSPA was concerned that, without sufficient funding, ARB's Report would be unfairly based on readily obtainable information rather than provide an in-depth assessment of the indoor air quality challenges that present actual public health impacts. Although we took a neutral position on the bill, CSPA supported the requirement that the Report include an examination of biological and radiological contaminants. Virtually every credible source of information about indoor air pollution (including ARB's website) lists biological agents (*e.g.*, toxic mold, dust mites, animal dander, and insect residues) and radiological agents (*e.g.*, radon) and improper building ventilation as primary causes.

The underlying statute provides reasonably clear instructions regarding the intent and content of this Report to the Legislature. The definition of "indoor air pollutants" for this Report is meant to include more than merely chemical pollutants and sources for assessing of "public health hazards." The Bill expressly states that the Report must provide:

> A listing that references work performed by other state or federal entities regarding biological and radiological substances, including a summary of activities conducted by the State Department of Health Services pursuant to Chapter 18 (commencing with Section 26100) of Division 20.[2]

[1] ARB's Draft Report to the California Legislature: Indoor Air Pollution in California circulated for public review in June 2004 and posted on ARB's website at: http://www.arb.ca.gov/research/indoor/ab1173/Report_06-30-04.htm

[2] *See* Cal. Health & Safety Code § 39930(a)(4).

CSPA representatives participated in ARB's workshops on April 4, 2003, and July 27, 2004. At these meetings, CSPA articulated the need to maintain a broad definition of the indoor air quality problems and solutions to be reviewed in this Report. In particular, CSPA emphasized the need to consider various biological contaminants, including insect and microbial contaminants, for which scientific evidence demonstrates significant public health impacts and to take a risk-based approach when comparing public health problems and solutions. CSPA is concerned that the Report could erroneously emphasize chemical emissions with little or no public health impact, while failing to assess the much higher health impacts of biological contaminants.

After reviewing the Draft Report, CSPA continues to be concerned about its undue emphasis on indoor emissions that present little or no health risks while largely ignoring more significant risks. Although some biological contaminants are mentioned in the Draft Report, the primary emphasis remains on chemical contaminants. The health impacts of microbial contaminants, including bacteria and funguses, are largely ignored, even though their impact probably far exceeds any of the other contaminants assessed.

In addition, ARB fails to consider the rigorous product safety regulations that govern formulated consumer products and the efforts of manufacturers of those products to assure product safety that go beyond mere regulatory compliance. (We have provided in Attachment A to these comments a brief review of the key federal laws and regulations.) ARB's failure to consider the impacts of its own volatile organic compound (VOC) regulations on consumer products is especially perplexing.

Consumer product manufacturers conduct safety assessments of their products to assure that the products can be used safely. These assessments consider both acute and chronic exposures and effects, and consider both proper use (according to label instructions) and reasonably foreseeable misuse. CSPA members that have joined CSPA's Product Care[sm] program, in particular, have committed to a very rigorous set of product safety management principles (see Attachment B). CSPA members apply these principles to assure that their products do not create indoor air quality problems, and in many cases to assure that the products are effective in improving indoor air quality and overall indoor environments.

Another critical flaw throughout the Draft Report is the failure to consider the public health and indoor air quality benefits of many of the formulated consumer products that are instead (and inappropriately) considered only as potential sources of indoor air "pollutants." Many of our member companies' products play a key role in lowering indoor exposures to biological contaminants such as dust mites, cockroaches, bacteria, viruses, and mold, which cause significant health problems in California and elsewhere. (We have included as Attachment C to these comments a brief review of the many public health benefits of household and institutional consumer products.)

STATEMENT OF INTEREST

CSPA is a voluntary, nonprofit national trade association representing approximately 240 companies engaged in the manufacture, formulation, distribution, and sale of consumer specialty products for household, institutional, commercial and industrial use. CSPA member companies' wide range of products includes nonagricultural pest management products,

antimicrobial products, air care products, industrial and automotive specialty products, cleaning products, polishes and floor maintenance products, and various types of aerosol products. These products are formulated and packaged in many forms and are generally marketed nationally. Many of these products are designed to maintain hygienic and healthy homes, institutions and workplaces, and contribute to maintaining and improving the quality and safety of the indoor environment.

COMMENTS ON DRAFT REPORT

The following represent our specific comments on the Draft for Public Review of the Report to the California Legislature on Indoor Air Pollution in California.

Executive Summary

The section on "Children Are Especially Vulnerable to Poor Indoor Air Quality" (page 2) makes a number of general claims about the increased vulnerability of children to indoor air problems without citing any competent and reliable scientific evidence. In general, the scientific evaluations we have seen on this issue conclude that children are more sensitive to some exposures and effects, less sensitive to some exposures and effects, and neither for yet other exposures and effects.

Table ES-1 (page 3), which summarizes the "Sources and Potential Health Effects of Major Indoor Air Pollutants," improperly aggregates large classes of "pollutants" with a wide range of properties, toxicity, sources, and health effects, to the point that the reader may mistakenly believe that each individual "pollutant" in any category is emitted by each source listed and causes each health effect listed, regardless of the amount emitted or biologically available. Only the most toxic pollutants likely to be present indoors, their most likely sources, and their most likely health effects given the known levels indoors should be listed, individually, here. Without proper specificity and context, the current Table will only serve to needlessly frighten, confuse and mislead California residents.

The Table correctly includes "Biological Agents," defined to include "bacteria, fungi, house dust mites, animal dander, cockroaches," as major indoor air pollutants. For some of the chemical pollutants, however, the "major indoor sources" identified include some relatively minor sources. Neither air fresheners nor cleaning agents, for instance, are major sources of any of the "organic chemicals" listed, with the minor exception of para-dichlorobenzene – a chemical compound which will be eliminated by December 31, 2005, pursuant to the ARB's CONS-1 Rulemaking. [3] Neither aerosol sprays nor candles contribute significantly to the emissions of respirable particulate matter that potentially presents the listed potential health effects. Regarding "endocrine disrupters," it is too early to assess this potential class of pollutants, with significant ongoing research needed to determine what potential health effects might occur and what substances might present risks of adverse health effects.

[3] Documents related to the CONS-1 rulemaking may be accessed at: http://www.arb.ca.gov/regact/conprod/conprod.htm.

It is inaccurate to characterize the 2003 study by Rosenman et al. (page 4) as having "further demonstrated an association between asthma symptoms and VOCs, primarily from cleaning products." Epidemiological studies such as this are often subject to confounding factors that mask actual causes; in the case of cleaning personnel, it is very likely that they were also subject to increased exposures to the soils they were cleaning, which include many biological contaminants (such as insects and molds) that are known asthma triggers. This is recognized by Delfino in the paper also cited on page 4 of the Draft Report, which notes in its review of the evidence of potential connections between VOCs and asthma that:

> All of the above studies of indoor VOCs may be subject to unmeasured confounding by other causal agents that increase indoors under low ventilation conditions, including aeroallergens, or that are correlated with VOCs for other reasons. Most, but not all, of the studies controlled for ETS. The research to date is too sparse to evaluate causality from indoor home VOCs, but there is even less information to evaluate the public health impact on respiratory health from outdoor VOCs, which include some of the same compounds found indoors.

In the review of the potential "irritant effects" of indoor air pollutants (page 5), it is incorrectly stated that, "Terpenes such as pinene and limonene are potentially reactive chemicals that are frequently used in cleaning products for their favorable odor characteristics and solvent properties. These and other irritant chemicals are commonly found indoors." It is not accurate to characterize terpenes as "irritant chemicals," and it is very misleading to characterize these chemicals as "indoor air pollutants." Terpenes such as pinene (pine oil) and limonene (orange oil) are seldom irritants, even at relatively high levels of exposure. Outdoor vegetation represents the primary source of terpenes in ambient air with emissions that dwarf those that occur from their use in household cleaning products.

The second paragraph in this section is contradictory and speculative in discussing Sick Building Syndrome (SBS), correctly noting that "the specific causes of SBS have not yet been firmly identified" (indeed the very definition of SBS) but only after the innuendo that "irritant chemicals" are suspected.

The review of the potential sources of harmful particulate matter (page 5) includes "candle burning" in the list of sources of "PM with harmful components similar to those in outdoor air." It is not clear what size particles are being discussed: PM_{10}, $PM_{2.5}$, respirable (generally considered to be in the size range of one to ten microns), or some other classification. Various particles vary greatly in their size and chemistry, as well as their potential for adverse effects. Studies have shown that most of the particulates emitted by candles are below the one-micron range, and therefore not considered respirable.

Furthermore, this section does not analyze the important differences in the physics and chemistry of particles outdoors and indoors, including the greater tendency indoors for particles to agglomerate and fall out, and to be captured in "sinks" such as fabrics and carpeting. The section appropriately includes, however, the acknowledgement that "current studies have not directly addressed the potential impacts of indoor PM on health."

In the section on toxic air contaminants (page 7), the use of the broad term "Volatile Organic Compounds" (VOCs) to represent a very narrow class of chemicals that may present health concerns is potentially misleading. Most of the many thousands of chemicals that are in the broad chemical class of VOCs are not "Toxic Air Contaminants" and do not present potential health impacts at the levels at which they exist in indoor air.

The term "Pesticides" (page 8) is also a broad term, covering a broad range of chemicals. Not all pesticides are "very persistent in the environment" or capable of causing "adverse developmental and neurological effects," even if present at some undefined "elevated levels of exposure." From the perspective of insecticides used indoors to control allergen-producing cockroaches, dust mites, and the like, the class of chemicals that are commonly used indoors are photolabile chemicals that do not persist for long in the environment. Synthetic-pyrethroid insecticides have replaced the organophosphate chemicals that were more persistent indoors, often lasting six to seven weeks before degrading.

In addition, pesticides are regulated by the US Environmental Protection Agency (EPA) in both formulation and labeling. The California Department of Pesticide Regulation also reviews products fully before they may be sold and used in the state. Risk assessments are conducted by registrants and regulatory agencies to assure that products are not capable of producing "adverse developmental and neurological effects".

The review of "Biological Contaminants" (page 8) is a woefully inadequate two paragraphs, especially given the concluding sentence that Building-Related Illness (BRI) "impacts can be substantial, and are of increasing interest as the role of buildings in promoting diseases of biological contaminants becomes better understood."

The discussion of "Environmental Justice Considerations" (page 9) properly notes that "dust mites, cockroaches, and mold are important triggers for asthmatics that are more likely to be present in urban settings where lower income individuals most often live." Unfortunately, by repeatedly stigmatizing cleaning products, which eliminate mold, and pesticides, which eliminate dust mites and roaches, as sources of indoor air "pollutants" throughout this Draft Report, ARB is reducing the opportunity for, and thus likelihood of, mitigating these pests and their allergens. As we have noted, the health and safety benefits of products used indoors needs to be fully considered in this Report (see Attachment C).

Table ES-2 (page 10), which provides "Estimated Annual Costs of Indoor Air Pollution in California", shows that the vast majority of estimated costs are associated with environmental tobacco smoke (ETS) and the biological contaminants that most often cause BRI. (We note that there are no costs listed in the Table for radiological contaminants.) This result would be yet even more extreme if estimates had been developed on the impacts of other biological contaminants, especially infectious diseases caused by airborne bacteria and fungal spores. The costs of those illnesses, in medical costs and lost productivity, could exceed the $35 billion annual costs estimated for all other indoor air pollution impacts. According to the U.S. Centers for Disease Control (CDC), each year Americans are sick more than 4 billion days from infectious diseases and as a result spend more than $950 billion on direct medical costs. In addition, over 160,000 people in the United States die yearly with an infectious disease as the underlying cause.

Furthermore, the caveat in the text just above Table ES-2 – "Because of the limited amount of information available for accurately estimating indoor pollution costs and the broad range of effects and resultant costs, there is considerable uncertainty in the cost estimates shown." – should be noted in equally bold print just below the title of the Table.

The section on "Existing Regulations, Guidelines and Practices" (page 11) understates the regulations affecting products used indoors. Specifically, the section summarizing existing regulations setting "consumer product standards" (pages 12-13) notes only ARB's own VOC regulations and inappropriately dismisses U.S. Consumer Product Safety Commission (CPSC) regulations. As noted in Attachment C to these comments, there are numerous and comprehensive regulations aimed at assuring the safety and efficacy of various consumer products.

The section on "Methods to Prevent and Reduce Indoor Air Pollution" (page 14) asserts that "Terpenes could be removed from many products, thereby reducing related health risks." This statement clearly implies that health risks have been demonstrated from the use of terpenes in consumer products, which is not true and not supported by any of the studies referenced in this Report. This unsupportable recommendation should be eliminated from this Report. This section also fails to distinguish products that provide important health or safety benefits and thus improve the indoor environment (see Attachment C).

This section is also inconsistent when it states that "the benefits of ventilation are reduced when outdoor air pollution is present," yet a few sentences later correctly notes that "air filters are a normal component of mechanical HVAC systems."

CSPA strongly concurs, however, with ARB's (and others') recommendation (page 15) that "air cleaners that intentionally generate ozone should not be used indoors." This is an area where ARB and other agencies could play a valuable role in consumer education.

Table ES-3 (page 17), which provides a "Prioritization of Pollutant Sources for Mitigation," provides some conclusions that are difficult to justify based on the scientific data and economic analyses provided in this Report. Even though ETS and biological contaminants represent the vast majority of the costs associated with indoor air pollution (especially if infectious diseases had been fully considered), the top priority for mitigation is chemical contaminants from "Building Materials & Furnishings." In addition, "Consumer Products" are given high priority for mitigation based primarily on emitting "Toxic Air Pollutants" that are found in few, if any, products for use indoors. Meanwhile, no priority whatsoever is given to mitigating arguably the largest known sources of indoor air health risk -- biological contaminants, including insect parts, bacteria and fungi. Neither is any consideration given to the critical role that various consumer products already play in mitigating these risks and improving the quality of household and institutional indoor environments. In addition, Table E-3 includes as "Examples of Toxic Air Pollutants Emitted" substances, such as "terpenes" and "VOCs", that do not fit ARB's own stated definition of "Toxic Air Pollutants" (*i.e.*, TACs, Proposition 65 listed chemicals, and criteria pollutants). These classes of chemicals should be deleted from this table.

The draft report states on page 18 that, "Reformulation of other products, such as cleaning products to remove terpenes, could go far to reduce irritant and carcinogenic effects." This falsely implies that terpenes, and potentially other ingredients in cleaning products as well, are carcinogenic. Terpenes are not considered to be carcinogens or even irritants by any scientific or regulatory authorities. We strongly urge ARB to remove this false and unsupported statement (which is also repeated on page 124) from this Draft Report.

We note that the major study of California K-12th grade public schools by ARB and the Department of Health Services discussed in the Report (pages 19-20) found four primary problems: inadequate ventilation, formaldehyde concentrations, obvious mold and mold indicators, and noise levels.

In the Introduction and Background section (page 22), the conclusions reached by the 1994 *California Comparative Risk Project* (CCRP) appear hard to understand or justify. A study that speculatively ranks "residential and consumer product releases to air (indoor air)" as "high risk" while ranking known demonstrable risks such as carbon monoxide and lead as "medium risk" could not have based its assessment on generally accepted scientific principles.

The claim (page 23) that "burning candles" generates "pollutants" ignores the scavenging effect of candle flames in eliminating odor-causing and other unpleasant VOCs via combustion. This effect was used extensively and effectively in the early days of deep mining to attenuate explosion hazards caused by natural gas build-up in mine shafts.

Some of the contentions in the environmental justice section (page 26) are contradicted by scientific evidence and by common sense. Lower-income households are more likely to have exacerbated health problems due to increased exposure to biological contaminants, not more frequent use of cleaners, antimicrobials and pest control products to control these hazards. Lower-income, as well as higher-income, households achieve healthier indoor environments from the use of these consumer products.

Health Impacts, Sources and Concentrations of Indoor Air Pollutants

Although the observation (page 27) that "aerosol sprays or solvents emit much smaller quantities of pollutants" is correct, the allegation that "a high concentration of the chemical is consequently inhaled during product use" is generally not true. Aerosol products are highly directional and provide the already properly diluted amount of ingredients to the intended target.

The contention that "biological agents alone cannot explain the tremendous increase in asthma over the past few decades" and that "indoor and outdoor air pollution have been identified as potentially important contributors to the increase of asthma" (page 27) is problematic considering that air quality has improved significantly over those decades. One potential explanation that should be noted here is that over this time asthma has become recognized (appropriately) as a serious and treatable condition, thereby leading to an increased rate of diagnosis and treatment. This increased recognition of the disease may also explain some, if not all, of the increased mortality attributed to asthma. Other factors that have been identified that may be contributing to increased incidence and/or severity of asthma include increased hormone replacement therapy and increases in obesity.

Table 2.1 (page 28) on "Sources and Potential Health Effects of Major Indoor Pollutants" includes the same incorrect or misleading information we noted regarding Table ES-1 (page 3). Please see our earlier comments on Table ES-1.

The discussion of asthma (page 29) ignores more recent CDC data which indicate that the rate of Americans (per 1,000) experiencing an asthma attack in a 12-month period has decreased from 43.2 in 2001 to 42.6 in 2002 to 38.7 in 2003.

Tables 2.2 (page 29) and 2.3 (page 30) provide an accurate summary of the findings of the National Academy of Science Institute of Medicine study on the development and exacerbation of asthma. It is important to note that the only exposures with sufficient evidence of a causal relationship in the exacerbation of asthma (cat, cockroach, house dust mite, preschool ETS) or the development of asthma (house dust mite) are (except for ETS) biological contaminants. In addition, the only exposures with sufficient evidence of an association in the exacerbation of asthma (dog, fungi or molds, rhinovirus, and NO_x) or the development of asthma (preschool ETS) are also (except for ETS and NO_x) biological contaminants. No chemical found in any consumer product is known to be associated with the development or exacerbation of asthma. Yet, most of the discussion in this Report relates to the few chemical contaminants for which there is "limited or suggestive evidence" or even just "possible but insufficient evidence" of a relationship of the exposure to asthma.

As we noted earlier, the results of the 2003 Rosenman study and the 2002 Delfino review regarding potential relationships between asthma and exposure to cleaning products or related VOCs have not been accurately characterized in this Draft Report (see page 31). There is no clear evidence that these VOCs are associated in any causative way with asthma.

The discussion of cancer (page 31) acknowledges that radon is one of the few "identified carcinogens commonly found in indoor air," yet costs associated with it are not listed in Table ES-2 (page 10) and it is not a listed priority in Table ES-3. Those oversights need to be corrected.

Table 2.4 (page 32), "Common Carcinogenic Indoor Air Pollutants," needs to be revised. The Table includes four compounds that are not classified as even possible human carcinogens (styrene, 1,1,1-trichloroethane, o-xylene and m,p-xylene). These should most certainly be removed. It is even questionable to include a substance such as acrolein, which is classified as Group C, a possible human carcinogen. We believe that only known and probable human carcinogens should be included in this Table.

The estimate of "230 excess cancer cases per year in California from indoor sources of toxic air contaminants" (page 32) requires further explanation to avoid being misleading to those not familiar with the conventions of carcinogenic risk assessment. It should be explained that such risk assessments represent a <u>maximum</u> risk estimate, and that <u>actual</u> risk could be much lower or even zero. In addition, the use of ten-year-old data is most certainly problematic in this area. There is today no significant use of formaldehyde in consumer specialty products. Para-dichlorobenzene usage has decreased significantly over the past decade and will be almost completely eliminated in California next year. Trichloroethylene and perchloroethylene are used

in few if any consumer products for use indoors. Perchloroethylene now is also not used in consumer products designed for indoor use. Many of the other chemicals on which this assessment was apparently based have not been used in consumer products for decades, if ever. More recent data or estimates must be used in this assessment for it to have any relevance. It is disingenuous to claim that the ten-year-old CCRP estimates "remain the best available" when all parties recognize the serious drawbacks; an updated study should be a condition precedent for any new initiatives on indoor air pollution.

The generalized statements about the risk of exposure to VOCs and their sources indoors (page 34) again rely on the overly broad categorization noted above.

Section 2.1.3 on "Irritant Effects" (page 34) focuses solely on chemical irritants, while virtually ignoring the far more important class of biological irritants that cause most indoor air problems. The Report also cites the seminal Mendell literature review "linking SBS symptoms with air-conditioning, carpets, more workers in a space, video display use, and ventilation rates at or below 10 liters/second/person," yet recommendations in those areas are inexplicably sparse.

The referenced 2003 study by Fan et al is described in a very misleading manner (page 35). The authors of that study actually concluded that the best strategy to attenuate this potential problem would be to lower outdoor ozone levels and/or minimize ozone migration to indoors. It is currently not possible to determine whether potential health impacts might exist due to the indoor air chemistry research being done relating to mixtures of alkenes and oxidants. It is not yet clear what chemistry occurs at the levels of these compounds actually found in indoor environments or whether the reaction products present any potential health risks. The U.S. EPA has recently cautioned the news media and their audience that the ongoing studies have not shown evidence of health concerns.

There are several generalizations on pages 38-39 of the Draft Report regarding particulate matter (PM) from candles that should be deleted or significantly revised, including**:**

- The entire second paragraph (page 38) is highly speculative and extrapolates data from gas stoves to all indoor combustion sources based on a single reference (Long, et al). The Draft Report should be revised to indicate which specific indoor sources are known to produce more reactive PM emissions, based on the data of Long, et al., and not speculate that all indoor combustion products produce them. Also, the rationale of why these indoor air pollutants are more reactive lacks references, and thus the speculation should be deleted until the results of the research appropriately called for in the Draft Report are available.
- The last paragraph (page 38) states that candles are a significant source of indoor PM, but does not provide any data to back this allegation. Such an assertion should not be made, unless data are provided regarding how much indoor PM is actually contributed by candles as compared to other sources.
- The last paragraph (page 39) notes that candles produce 200-3600 µg/hour of PM. Although there may be candles that produce this amount, a more meaningful measurement would be the airborne concentration (in $\mu g/m^3$) of PM in a room while a candle is being burned.

- It should also be noted in this section that much of the PM from clean-burning candles are below one micron in diameter, and therefore not generally considered to be respirable.

The section on particulate matter contains a single small paragraph on biological contaminants (page 40), despite abundant evidence on the widespread health impacts of fungi, bacteria, dust mites, cockroaches, pollen, and other such biological indoor particulates. Although a thorough review of the health effects and risks of biocontaminants would require hundreds of pages, these important indoor pollutants should be given more substantial treatment as compared to the many pages used to review other particulates in order to provide a more accurate and balanced perspective.

It is important to note that the mortality data and much of the morbidity data cited for carbon monoxide (pages 45-46) represent specific cases where etiology is reasonably well-established, as opposed to much of the other chronic risk estimates cited in this Report. These cases are evidence of real, not hypothetical, health effects specifically caused by exposure to carbon monoxide (CO) gas, and thus mitigation would produce real, not hypothetical, public health benefits and cost savings.

The Report states that consumer products are a source of formaldehyde (page 49). With the possible exception of some coatings and adhesives, this is not accurate. There is little or no contribution to indoor formaldehyde levels from our industry's formulated household consumer specialty products.

Section 2.3.2 (pages 54-60) uses the broad term "volatile organic compounds" or "VOCs" when it appears that what is actually meant is the small class of VOCs currently classified as Toxic Air Contaminants. Most VOCs have no adverse health effects at the levels found in indoor air. We also question the statement (page 54) that, for carcinogens, there is "no level of exposure to these chemicals that is known to be absolutely safe." While this is the common convention used in the art of carcinogenic risk assessment to assess maximum potential risks, it is not supported by scientific data. In fact, pharmacokinetic data have provided strong scientific evidence for many substances that carcinogenic no-effect levels, or thresholds, exist.

Section 2.3.2.2 on "Sources and Emissions of VOCs" (page 55) contains significant amounts of dated or inaccurate information. Consumer products are not formulated with benzene, nor has benzene been used in such products for many decades. Toluene is seldom used in consumer products meant for indoor uses. Para-dichlorobenzene, as noted earlier, has seen a very significant decrease in use since 1991 when EPA's TEAM studies were conducted, and most uses of this compound will be restricted in California next year. Methylene chloride is used only in some paint strippers and such products are carefully labeled for use with adequate ventilation.

Data from a study by Shepard et al are referenced (page 56) showing that chloroform can be released to indoor air during a ten-minute wash cycle when using sodium hypochlorite bleach. However, the Draft Report fails to mention that the concentration and amount of byproduct compounds emitted from sodium hypochlorite bleach during its use is far below accepted acute and chronic exposure limits, including trigger levels set under California's Proposition 65 law.

Therefore, using bleach-based products in a manner directed on the labels presents a negligible risk to human health. This should be noted in the final Report.

This section on VOCs is grossly misleading due to its failure to acknowledge that the mere existence of a VOC in a product or in indoor air, even if it is currently classified as a Toxic Air Contaminant, does not mean that any risk exists of adverse health impacts. This fact should be conveyed to put many of the studies cited in perspective. Consumer products are carefully evaluated to assure that exposure levels are well below known no-effect levels.

Ethylene glycol is toxic by ingestion but, due to the low volatility of this compound, it is virtually impossible to attain toxic dose levels through inhalation of vapors. The emissions of ethylene glycol, propylene glycol (a food additive approved by the U.S. Food and Drug Administration), Texanol, various alkanes, and butoxyethanol cited as being emitted from latex paints (page 57) produce exposure levels orders of magnitude below no-effect levels. The cited study by Akland and Whitaker (2000) that purports to have found benzene and acetaldehyde in consumer cleaning products is simply in error. Similar errors appear to have occurred in the study cited by Zhu et al. (2001), since neither 2-methoxyethanol nor 2-ethoxyethanol are used in household or institutional cleaning products. The claims cited in the paper by Cooper et al. (1995) regarding the potential adverse effects of chemicals used in perfumes are appropriately attenuated by the statement, "however, these health effects generally occur at much higher levels than would be expected from the use of these products." It would be more accurate to say, however, that these health effects only occur at much higher levels of exposure.

The statement (page 58) that "Four of the most abundant 12 VOCs are oxygenated, which may indicate a greater potential to cause irritant effects" has no basis in scientific fact. There is no known correlation between oxygen content and irritation, except in the case of organic acids.

Section 2.3.4 (page 63) on "Biological Contaminants" provides an excessively and disproportionately brief two-page overview of the health effects of these critical indoor air contaminants, and virtually no information on exposure levels or the prevalence of health effects. Considering the many thousands of studies and extensive statistics gathered by federal and state public health agencies, this brief coverage is indefensible. Indoor mold alone will be the subject of an entire separate report to the California Legislature, but is provided only one-half page in this Report. The health impacts of biological contaminants, and the potential benefits of mitigating exposures, undoubtedly far exceed those of various chemical contaminants that are covered in far greater depth. It is essential that ARB seek to develop a more balanced Report in this regard.

Section 2.3.7 (page 70) on "Mercury" states that it is intentionally added to "disinfectants to add antibacterial properties." This is not true. No hard-surface disinfectants or other household or institutional cleaning products contain mercury as the active antimicrobial ingredient. The statement that mercury "can also be found as an accidental contaminant in detergents and cleansers due to its use in the chloralkali industry" is true. However, the miniscule amounts of mercury in consumer cleaning products primarily comes from natural sources such as mined materials used to produce the ingredients for consumer products, or in the water used to formulate products—water that comes from the same sources of supply as drinking water.

Costs of Indoor Air Pollution

As noted earlier in these comments, it is important to distinguish between the estimated costs associated with illnesses where etiology can be established on as case-by-case basis (*e.g.*, CO poisoning or specific microorganisms) and illnesses where etiology can be estimated only through worst-case risk assessment methodologies (*e.g.*, chronic diseases and multiple associated exposures). While relative accurate estimates can be made, for instance, of the mortality and morbidity attributable to CO poisoning or influenza viruses, the estimates from cancer risk assessments represents the upper limit of potential cases, with a lower limit that often is zero.

For this reason, the estimated mortality data shown in Table 3.2 (page 81) are at best highly misleading and in other cases provide an inaccurate portrayal of the data. In this Table, only the CO-poisoning data and some of the mold/asthma/allergy data are based on cases where etiology has been reasonably established. The ETS assessments on cancer and heart disease are based on estimates from epidemiological investigations, which should provide a wide range of statistical probabilities. (For this reason, we must question the lack of a range provided in the ETS cancer estimate. This is handled more appropriately in the ETS heart disease estimates.) The estimate for "VOCs: Cancer" is undoubtedly based on even more uncertain data and assessments, often by extrapolating animal data to obtain maximum human risk estimates, and applying these risk estimates to maximum lifetime exposure estimates, to obtain an estimate for attributable mortality. The reference of a single number (115) for "low," "average" and "high" estimates for cases/year is not only misleading but grossly inaccurate considering the multiple uncertainties in the methodology. To provide an accurate characterization of data from such assessments, the "average" should be significantly lower than the "high" estimate and the "low" estimate of premature deaths should be zero.

Table 3.6 (page 90) noting the "Summary of Estimated Costs of Indoor Air Pollution in California" is virtually identical to Table ES-2, so our previous comments apply here. It also suffers from all the same problems as Table 3.2, as it mixes cost estimates of very different types. This Table needs to be revised to provide a range of cost estimates (from high to low) for these health end points and potential causes. In addition, the terminology on this Table should be revised to be more accurate and less misleading. While "CO: poisoning" may be a "Health End Point," "VOCs: cancer" is not a diagnosable health end point. We suggest using the term "Health End Point with Potential Causative Exposure" for the column heading, and "Cancer potentially caused by toxic air contaminants" instead of the misleading "VOCs: cancer".

Noticeably lacking in Table 3.6, as mentioned earlier in these comments, is any assessment of the costs for the many other diseases caused by biological contaminants other than allergies and asthma from mold and SBS. Even a cursory analysis will find that diseases attributable to bacteria, fungi, insects, po1len, and other biological contaminants in indoor air far exceeds that currently included from all other sources in terms of mortality, morbidity, and societal costs. CSPA believes that the statutory mandate to assess these risks and costs fully is clear, and that this information is essential to a complete and unbiased assessment of indoor air quality challenges in California.

Existing Regulations, Guidelines, and Practices

This section fails to properly convey the rigorous regulatory requirements that currently exist to assure the safety and effectiveness of formulated household and institutional consumer products. (We have included as Attachment A to these comments a copy of a brief review of the key federal laws and regulations affecting these consumer products.) California also has additional regulations, including extensive consumer product VOC regulations promulgated by ARB, regulations promulgated by the Office of Environmental Health Hazard Assessment pursuant to Proposition 65,[4] and rigorous pesticide registration regulations promulgated by the Department of Pesticide Regulation.

ARB's failure to consider the impacts of its own VOC regulations on consumer products is especially perplexing. ARB has promulgated over the past 15 years more than 200 VOC limits that impact virtually every category of formulated consumer product, some of which have had to be reformulated two or three times. In June, ARB adopted additional VOC limits for various categories of products and will begin later this year to develop a comprehensive new regulation that could regulate many of these products again. ARB has also with these regulations eliminated the use of a number of "Toxic Air Contaminants," including chlorinated solvents and para-dichlorobenzene, from many products. The US EPA forced the elimination of 23 inert ingredients some years ago and has required the labeling of other "toxic inerts" on the front panel of consumer products. The practical impact of this has been to cause those ingredients to no longer be used.

This section also fails to recognize the practices of the consumer specialty products industry in assuring the safety of its products. Consumer product manufacturers conduct safety assessments to assure that their products can be used safely. State and federal regulatory bodies also conduct risk assessments on pesticide products to assure that product use does not create "unacceptable adverse effects on man or the environment." These assessments consider both acute and chronic exposures and effects, and consider both proper use (according to label instructions) and reasonably foreseeable misuse. CSPA members that have joined CSPA's Product Care[sm] program, in particular, have committed to a very rigorous set of product safety management principles (see Attachment B). CSPA members apply these principles to assure that their products do not create indoor air quality problems and, in many cases, to assure that the products are effective in improving indoor air quality and overall indoor environments.

Methods to Prevent and Reduce Indoor Air Pollution

Section 5.1 (page 118) on "Source Control" contains a number of misleading or even inaccurate statements. Disposing of "aerosol spray products stored in a closet or under the sink" will not "remove these sources from the home," since aerosol containers are carefully sealed and are not significant sources of fugitive emissions, even after many years of storage. It is difficult to imagine what is meant by "a liquid cleaner with a reduced rate of pollutant emissions," since indoor cleaning products do not contain "pollutants" but rather serve to reduce indoor air pollution by cleaning soils from surfaces that would increase the growth of microbial and insect

[4] Safe Drinking Water and Toxic Enforcement Act of 1986; Cal. Health & Safety Code §§ 25249.5 - 25249.13.

pests and the biological contaminants that they contribute to indoor air. The statement that "consumer products can often be reformulated by the manufacturer to reduce or eliminate any potentially harmful emissions with little or no impact on the consumer" is simply not true; when such reformulations have been found, they have been made by manufacturers. However, it is misleading to call this "often" and false to imply that significant further increases in product safety (or, more importantly to public health, product efficacy) are readily available and awaiting manufacturers finding adequate incentives to change their products. There is also, as noted earlier, no evidence that reducing pinenes and limonenes in cleaning products would create any health benefits.

CSPA fully supports the concerns expressed by the ARB in this Draft Report regarding the use of "air cleaners" that intentionally generate ozone in indoor air. We concur that these devices are counter-productive to indoor air quality. Effective air cleaning devices, however, can play a valuable role in enhanced indoor air quality, especially in removing biological contaminants. Effective air cleaning systems have at least one key benefit that cannot be provided by "source controls:" they provide a mechanism to assure that indoor air quality is higher than outdoor air quality. This is a critical benefit in many areas of California.

Prioritization of Sources and Pollutants Based on Exposure and Adverse Impacts

The prioritization of sources and pollutants "based on exposure and adverse impacts" in this chapter does not appear to be based even on the incomplete assessments presented earlier in the Draft Report. The earlier chapters provided evidence of potential significant impacts for ETS and factors associated by Mendell with SBS and noted the existence of "air cleaners" that intentionally emit a criteria pollutant (ozone) into indoor air. In addition, firmly established mortality and morbidity data are provided for CO poisonings. Yet, this chapter inexplicably selects "building materials and furnishings" as the highest priority for mitigation. It also selects "consumer products" as a medium priority despite the lack of evidence that the vast majority of these products have any adverse impacts on indoor air quality, but significant evidence that many consumer products serve to enhance indoor air quality and protect human health and safety.

In addition, Table 6.1 (as noted earlier regarding Table ES-3 on page 17) includes as "Examples of Toxic Air Pollutants Emitted" substances such as "terpenes" and "VOCs" that do not fit ARB's own stated definition of "Toxic Air Pollutants" (*i.e.,* TACs, Proposition 65 listed chemicals, and criteria pollutants). These classes of chemicals should be deleted from this table as well.

Options to Mitigate Indoor Air Pollution

CSPA generally concurs with the general mitigation options outlined in Section 7.1 (page 127). Our only concerns relate to the possible suggestion in option 3 that consumer products be included among the materials requiring "emissions testing" and "labeling," as well as the failure to address any specific mitigation options for the biological contaminants that present the greatest health risks and costs in California.

Summary

It is not an accurate characterization of the carcinogenic risk analysis performed in the CCRP to state that "at least 230 excess cancers per year are estimated to occur due to indoor carcinogens from residential and consumer sources, such as formaldehyde." A more accurate characterization of the estimate would be "as many as 230 excess cancers."

SUMMARY AND CONCLUSIONS

CSPA and its member companies appreciate this opportunity to review this Draft Report and provide our input. We believe that significant improvements are needed for this Report to represent a comprehensive and balanced scientific review of the indoor air quality challenges currently facing California. In these comments, we have made the following key recommendations for improving the Report:

- The Draft Report fails to adequately consider the key health hazards presented by biological contaminants such as bacteria, fungi, insects and pollen.
- The Draft Report fails to consider the key roles played by various consumer products in improving indoor air quality and protecting public health.
- The Draft Report presents estimates based on potential risks that are misleading and require clarification.
- The Draft Report includes inaccurate, dated and misleading information on consumer products that must be corrected to accurately reflect their impact on indoor air quality and public health.

We look forward to continuing to work cooperatively with ARB staff in its efforts to finalize this Report to the Legislature. We look forward to reviewing a revised Report that will be subjected to a scientific peer review and to commenting again when that new draft is received. Please feel free to contact us at any time if you have any questions.

Respectfully submitted,

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Attachments (3)

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